Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

**Osmosis Lab**

Ms. Ottolini, AP Biology

**Background Information:**

Osmosis occurs when different concentrations of water are separated by a differentially permeable membrane. One example of a differentially permeable membrane within a living cell is the plasma membrane. This experiment demonstrates osmosis by using dialysis membrane, a differentially permeable cellulose sheet that permits the passage of water but obstructs passage of large molecules (ex: sucrose). If you could examine the membrane with a scanning electron microscope, you would see that it is porous. Thus molecules larger than the pores cannot pass through the membrane. (courtesy of Boston University)

**Your Hypothesis:** Fill in the chart given below with a hypothesis predicting the direction of water movement for each experimental set-up.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Beaker #** | **Solution Inside Bag** | **Solution Outside Bag (in beaker)** | **Predict Mass Change of Bag** (ex: The mass of the bag will increase / decrease because water is moving into/out of the bag because….) | **Draw a Picture** (show the movement of water either into or out of the dialysis bag) |
| 1 | Distilled Water | Distilled Water |  |  |
| 2 | 15% Sucrose Solution | Distilled Water |  |  |
| 3 | 30% Sucrose Solution | Distilled Water |  |  |
| 4 | Distilled Water | 30% Sucrose Solution |  |  |

**Materials:**

-2 pieces of dialysis tubing per group

-4 pieces of string

-2 beakers

**Procedure – *Note: To save time, your group will be assigned two of the four bags.***

1. Your group will be assigned two bags/beakers from the list on the previous page (either 1 and 2 or 3 and 4)
2. Get 200 mL of outside solution for each of your two beakers. Don’t use a graduated cylinder. Just fill the beaker to the 200 mL line.
3. Get two pieces of dialysis tubing. Open the tubing by twisting at the top with your fingers and using a stirring rod to open the whole tube. Tie the tube at the bottom with a piece of string, fill it with 10 mL of solution, and tie it at the top with string. Make sure to push extra air out of the tube and leave extra space at the top of the tube before tying your string.)
4. Take the initial mass of the bag using the electronic balance (to the nearest tenth of a gram) and put it into the beaker solution.
5. 4) After 20 minutes, take bag out of solution, dry it, and determine the final mass using the electronic balance (to the nearest tenth of a gram). (Try to blot off as much water from the strings as you can before taking the mass).
6. At the end of the experiment, take the bags to the sink, cut them open, pour the contents down the drain and discard the bags in the wastebasket. Pour the contents of the beakers down the drain and wash them according to the instructions given by your teacher.

**Methods Summary Chart:**

|  |  |
| --- | --- |
| Independent Variable |  |
| Levels of the Independent Variable (if applicable) |  |
| Dependent Variable |  |
| Method for Measuring Changes in the Dependent Variable |  |
| Control Group (if applicable) |  |
| Constants (factors that stay the same between your control group and your experimental groups) |  |
| Number of Trials |  |

**Data Tables (Individual Lab Group)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Beaker # | Solution Inside Bag | Solution Outside Bag (in beaker) | Bag Mass (g)  0 Min | Bag Mass (g)  20 Min | Mass change from 0-20 mins (g) |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Data Tables (Class Averages)**

|  |  |  |  |
| --- | --- | --- | --- |
| Beaker # | Solution Inside Bag | Solution Outside Bag (in beaker) | Mass change  (g) |
| 1 | Distilled Water | Distilled Water |  |
| 2 | 15% Sucrose Solution | Distilled Water |  |
| 3 | 30% Sucrose Solution | Distilled Water |  |
| 4 | Distilled Water | 30% Sucrose Solution |  |

**Discussion / Conclusion:**

Break your discussion / conclusion paragraph down into four parts for the four different beakers. For each beaker, state whether the class average change in mass supported or refuted the original hypothesis. Provide the actual numerical value for class average mass change and restate your original hypothesis. Directly connect the data to the hypothesis, and discuss why water moved the way it did based on what you know about osmosis. Your discussion / conclusion paragraph will be graded using the following rubric.

Beaker 1:

-State the class average and whether this average supports or refutes the original hypothesis. (1 point)

-Explain HOW the data supports or refutes the hypothesis. (1 point)

-Discuss why water moved the way it did based on what you know about osmosis. (1 point)

Beaker 2:

-State the class average and whether this average supports or refutes the original hypothesis. (1 point)

-Explain HOW the data supports or refutes the hypothesis. (1 point)

-Discuss why water moved the way it did based on what you know about osmosis. (1 point)

Beaker 3:

-State the class average and whether this average supports or refutes the original hypothesis. (1 point)

-Explain HOW the data supports or refutes the hypothesis. (1 point)

-Discuss why water moved the way it did based on what you know about osmosis. (1 point)

Beaker 4:

-State the class average and whether this average supports or refutes the original hypothesis. (1 point)

-Explain HOW the data supports or refutes the hypothesis. (1 point)

-Discuss why water moved the way it did based on what you know about osmosis. (1 point)

**Total Points: \_\_\_\_\_ / 12**